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2600 Bull Street
Columbia, SC 29201-1708

9.2015

RE Evaluation of Bayer Corporation-Bushy Park Plant status under RCRAInfo Corrective Action Environmental Indicator Event Code CA750
EPA ID Number SCD 048 373 468

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FROM Bobbi Coleman Hydrogeologist BC
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

THRU Joe Bowers, Section Manager
RCRA Hydrogeology Section
Division of Hydrogeology
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Michelle Sherritt, Section Manager
Operations Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

John Litton, Division Manager
Division of Waste Management
Bureau of Land and Waste Management

TO Bayer Corporation – Bushy Park Plant Project File
EPA ID # SCD 048 373 468
Central File Room # 051398

DATE September 13, 2001

RE Evaluation of Bayer Corporation status under RCRIS Corrective Action Environmental Indicator Event Code CA750
EPA ID Number SCD 048 373 468

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Bayer Corporation- Bushy Park Plant's status in relation to the Migration of Contaminated Groundwater Under Control (CA750) corrective action code defined in the Resource Conservation and Recovery Act Information System (RCRAInfo)

An evaluation of Bayer's status in relation to the current Human Exposures Under Control (CA725) corrective action event code has been finalized under separate cover (Rippy to Bayer- Bushy Park Plant Project File, dated September 5, 2001)

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

See the above referenced memorandum (Rippy to Bayer- Bushy Park Plant Project File, dated September 5, 2001)

III. FACILITY SUMMARY

See the above referenced memorandum (Rippy to Bayer- Bushy Park Plant Project File, dated September 5, 2001)

IV. CONCLUSION FOR CA750

Releases from on-site sources have contaminated groundwater at levels exceeding regulatory limits It is our best technical judgment that contamination has migrated off-site to surface water However, based on facility submitted potentiometric maps, it appears as though groundwater is under control

V. SUMMARY OF FOLLOW-UP ACTIONS

Recovery wells are operational at the facility and potentiometric maps illustrate that the recovery wells should be capturing contamination The facility will be required to continue routine groundwater monitoring as outlined in the facility's draft permit, dated August 9, 2001

ATTACHMENT 1
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code (CA750)

Facility Name: **Bayer Corporation – Bushy Park Plant**
Facility Address: **PO Box 18088**
Facility EPA ID #: **SCD 048 373 468**

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e g , reports received and approved, etc) to track changes in the quality of the environment The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater An EI for non-human (ecological) receptors is intended to be developed in the future

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i e , site-wide))

Relationship of EI to Final Remedies

While final remedies remain the long-term objective of the RCRA Corrective Action program, the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA) The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i e . further spread) of contaminated ground water and contaminants within groundwater (e g , non-aqueous phase liquids or NAPLs) Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i e , RCRIS status codes must be changed when the regulatory authorities become aware of contrary information)

1 Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e g , from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

_X_ If yes - check here and continue with #2 below,

____ If no - re-evaluate existing data, or

____ If data are not available, skip to #8 and enter AIN≡ (more information needed) status code

2 Is **groundwater** known or reasonably suspected to be **"contaminated"** above appropriately protective "levels" (i e , applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

_X_ If yes - continue after identifying key contaminants, citing appropriate "levels", and referencing supporting documentation

____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels", and referencing supporting documentation to demonstrate that groundwater is not "contaminated"

____ If unknown - skip to #8 and enter "IN" status code

Rationale and Reference(s)

Fourth Quarter / Annual 2000 RCRA Post-Closure Care Groundwater Monitoring Report, dated March 5, 2001

Groundwater Monitoring Well	Contaminant	Level	Regulatory Limit and Type
W-11	Benzene	11 5 parts per billion (ppb)	5 0 ppb - Maximum Contaminant Level (MCL)
W13RX	Aniline	11 06 ppb	10 ppb - Practical Quantitation Limit (PQL)
W-14	Aniline	10 82 ppb	10 ppb - PQL
	Chlorobenzene	105 ppb	100 ppb - MCL
W-17	Aniline	44 ppb	10 ppb – PQL
	p-Chloroaniline	296 ppb	10 ppb – PQL
	Naphthalene	74 4 ppb	20 ppb - PQL
W-66	Benzene	8 55 ppb	5 0 ppb - MCL
W-75	Arsenic	223 ppb	50 ppb - MCL
W- 80	Chlorobenzene	309 ppb	100 ppb - MCL
W-81	Aniline	10 14	10 ppb - PQL
	Arsenic	69 4 ppb	50 ppb MCL
W-85	Aniline	16 7 ppb	10 ppb - PQL
W-99	Arsenic	136 ppb	50 ppb – MCL
	Chlorobenzene	420 ppb	100 ppb -MCL

First Quarter 2001 RCRA Post-Closure Care Groundwater Monitoring Report, dated May 14, 2001

Groundwater Monitoring Well	Contaminant	Level	Regulatory Limit and Type
W-11	Arsenic	172 ppb	50 ppb - MCL
W-13	Arsenic	85 7 ppb	50 ppb -MCL
W-15	Chloroform	6 39 ppb	0 16 ppb – Preliminary Remediation Goal for Tap Water (PRG)
W-17	Aniline	32 8 ppb	10 ppb – PQL
	p-Chloroaniline	334 ppb	20 ppb – PQL
	Naphthalene	70 8 ppb	10 ppb- PQL
W-66	Benzene	9 2 ppb	5 ppb - MCL
W-75	Arsenic	259 ppb	50 ppb - MCL

Groundwater Monitoring Wells W-17 and W-66are suspect for Volatile Organic Compounds since several detection limits exceeded the regulatory limits

Second Quarter 2001 RCRA Post-Closure Care Groundwater Monitoring Report, dated August 14, 2001

Groundwater Monitoring Well	Contaminant	Level	Regulatory Limit and Type
W-11	Benzene	5 51 ppb	5 0 ppb - MCL
W-17	Naphthalene	90 2 ppb	10 ppb – PQL
	p-Chloroaniline	322 ppb	20 ppb PQL
W-66	Benzene	8 65 ppb	5 0 ppb – MCL
	Chlorobenzene	520 ppb	100 ppb - MCL
W-75	Arsenic	63 6 ppb	50 ppb - MCL
W-80	Chlorobenzene	255 ppb	100 ppb - MCL
W-81	Arsenic	66 9 ppb	50 ppb - MCL
W-99	Arsenic	105 ppb	50 ppb – MCL
	Chlorobenzene	533 ppb	100 ppb - MCL

Groundwater Monitoring Wells W-17, W-66, W-80,and W-99 are suspect for Volatile Organic Compounds since several detection limits exceeded the regulatory limits

3 Has the **migration** of contaminated groundwater **stabilized** such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater' as defined by the monitoring locations designated at the time of this determination?

__X__ If yes - continue, after presenting or referencing the physical evidence (e g , groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[6])

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - skip to #8 and enter "NO" status code, after providing an explanation

____ If unknown - skip to #8 and enter "IN" status code

Rationale and Reference(s)

Groundwater, vertically, appears to be captured in the areas where contamination has been validated, based on potentiometric maps submitted by the facility within the Fourth Quarter / Annual 2000 RCRA Post-Closure Care Groundwater Monitoring Report, dated March 5, 2001, the First Quarter 2001 RCRA Post-Closure Care Groundwater Monitoring Report, dated May 14, 2001, and the Second Quarter 2001 RCRA Post-Closure Care Groundwater Monitoring Report, dated August 14, 2001

4 Does "contaminated groundwater **discharge** into **surface water** bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies

____ If unknown - skip to #8 and enter "IN" status code

Rationale and Reference(s)

The Cooper River

5 Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i e , the maximum concentration[7] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level", and there are no other conditions (e g , the nature and number of discharging contaminants, or environmental setting) which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

__X__ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting 1) the maximum known or reasonably suspected concentration[7] of key contaminants discharged above their groundwater "level", the value of the appropriate "level(s)", and if there is evidence that the concentrations are increasing, and 2) providing a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system

____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting 1) the maximum known or reasonably suspected concentration[7] of each contaminant discharged above its groundwater "level", the value of the appropriate "level(s)", and if there is evidence that the concentrations are increasing, and 2) for any contaminants discharging into surface water in concentrations[1] greater than 100 times their appropriate groundwater "levels", providing the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identifying if there is evidence that the amount of discharging contaminants is increasing

____ If unknown - enter "IN" status code in #8

Rationale and Reference(s)

Arsenic at approximately 100-135 ppb and Chlorobenzene at approximately 425-525 ppb in groundwater monitoring well W-99 is of concern due to its proximity to the Cooper River However, this area is thought to be under control due to the operation of numerous recovery wells in this area and supporting documentation of potentiometric maps submitted from the facility In the future, should these levels not begin to decline at W-99, it may be necessary to access the potential for continued migration of the contaminant plume

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[1] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e g , hyporheic) zone

6 Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i e , not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[2])?

____ If yes - continue after either 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater, OR
2) providing or referencing an interim-assessment,[3] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels", as well as any other factors, such as effects on ecological receptors (e.g , via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination

____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems

____ If unknown - skip to 8 and enter "IN" status code

Rationale and Reference(s)

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2 Note, because areas of inflowing groundwater can be critical habitats (e g , nurseries or thermal refugia) for many species, appropriate specialist (e g , ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies

3 The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters sediments or eco-systems

7 Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

__X__ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination"

____ If no - enter "NO" status code in #8

____ If unknown - enter "IN" status code in #8

Rationale and Reference(s)

The facility will be required to continue routine groundwater monitoring as outlined in the facility's draft permit, dated August 9, 2001 Groundwater contamination at the Bayer facility is thought to be under control due to the operation of numerous recovery wells in the area of groundwater monitoring well W-99, located in close proximity to the Cooper River and supporting documentation of potentiometric maps submitted from the facility In the future, should these levels not begin to decline at W-99, it may be necessary to access the potential for continued migration of the contaminant plume

8 Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility)

__X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Bayer Corporation facility, EPA ID # SCD 048 373 468, located in the Bushy Park Industrial Complex in Berkeley County, South Carolina Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility

____ NO - Unacceptable migration of contaminated groundwater is observed or expected

____ IN - More information is needed to make a determination

Completed by Bobbi Coleman Date Sept. 13, 2001
Bobbi Coleman
Hydrogeologist

Supervisor Joe B Bowers Date 9-13-01
Joe Bowers
RCRA Hydrogeology Section Manager

Locations where References may be found

Fourth Quarter / Annual 2000 RCRA Post-Closure Care Groundwater Monitoring Report, dated March 5, 2001

First Quarter 2001 RCRA Post-Closure Care Groundwater Monitoring Report, dated May 14, 2001

Second Quarter 2001 RCRA Post-Closure Care Groundwater Monitoring Report, dated August 14, 2001

Contact telephone and e-mail numbers

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Cc Crystal Rippy, Operations Engineering
Wayne Fanning, Trident District EQC Office
Syed Ahmed, RCRA Programs Branch, EPA Region 4

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MEMORANDUM

SUBJ Evaluation of the status of **Bayer Corporation – Bushy Park Plant** under the RCRAInfo Corrective Action Environmental Indicator Event Code CA725
EPA I D Number **SCD 048 373 468**

FROM Crystal D Rippy, Engineering Associate CDR
Operations Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

THRU. Michelle D Sherritt, Manager MDS
Operations Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

John T Litton, P E., Director
Division of Waste Management
Bureau of Land and Waste Management

TO Bayer Corporation – Bushy Park Plant Project File
EPA ID # SCD 048 373 468
Central File Room # 051398

DATE September 5, 2001

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of the status of Bayer Corporation – Bushy Park Plant (Bayer), located in Berkeley, South Carolina, in relation to the *Current Human Exposures Under Control* (CA725) corrective action event code defined in the Resource Conservation and Recovery Act Information System (RCRAInfo) An evaluation of Bayer s status in relation to the *Migration of Contaminated Groundwater Under Control* (CA750) corrective action event code will be finalized under separate cover

Concurrence by the Operations Engineering Section Manager and the Division of Waste Management Director is required prior to entering this event code into RCRAInfo Your concurrence with the interpretation provided in the following paragraphs and the subsequent recommendation is satisfied by dating and signing at the appropriate location within Attachment 1

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This is the second evaluation for Bayer with regard to the CA725 corrective action event code. The first evaluation of Bayer's status with regard to both the CA725 and CA750 corrective action event codes was completed July 17, 1998 by EPA Region 4 Based on the information available at the time of the first

determination, a status code of 'IN' – 'more information needed' was entered for CA725 and a status code of 'NO' – 'facility does not meet definition' was entered for CA750

III. FACILITY SUMMARY

Bayer Corporation - Bushy Park Plant is located in Goose Creek, Berkeley County, South Carolina, east of the U S Naval Reservation and between the Back and Cooper Rivers which border the facility's western and eastern boundaries, respectively Bayer includes several divisions which manufacture dyestuff, dyestuff intermediates, pigments, organic chemicals, organic rubber chemicals, and synthetic fibers

Bayer has a hazardous waste management permit for the storage of hazardous waste in one (1) storage facility (the Hazardous Waste Storage Area located in the B12-2 Finished Goods Warehouse), the post closure care/corrective action of two (2) closed surface impoundments (the former holding pond and the former equalization pond), and the identification / corrective action of solid waste management units (SWMUs) and areas of concern (AOCs) A brief description of each unit follows

The Hazardous Waste Storage Area is located in the west end of the B12-2 Finished Goods Warehouse and has a maximum capacity of 47,520 gallons Types of waste which may be stored in the container storage area include waste ketone oils, waste filter bags, waste solvents, sump trench sludges, waste paint solids, and additional waste not routinely generated Waste codes associated with these wastes include D001 (ignitable wastes), D021 (chlorobenzene), D022 (chloroform), D035 (methyl ethyl ketone), F001 and F002 (spent halogenated solvents), F003 and F005 (spent non-halogenated solvents), and P- and U-listed waste (discarded commercial chemical products, off-specification material, container residues, and spill residues).

The closed surface impoundments consists of one (1) former equalization pond and one (1) former holding pond These units had a maximum combined capacity of 7,800,000 gallons per day and received corrosive (D002) wastewater The former Holding Pond and the former Equalization Pond were closed in accordance with the approved closure plans by April 12, 1988 and by May 4, 1989, respectively

To date, one-hundred (100) SWMUs and seven (7) AOCs have been identified at Bayer A complete listing of these units and the required action (i e Confirmatory Sampling, RCRA Facility Investigation, etc) can be found in Bayer's draft renewal Hazardous Waste Permit public noticed August 9, 2001

IV. CONCLUSION FOR CA725

Name and I D. No.	Location (City or Town)	Date of Latest EI Memo	CA 725 Decision
Bayer Corporation – Bushy Park Plant SCD 048 373 468	Goose Creek, SC	September 5, 2001	"YE"

V. SUMMARY OF FOLLOW-UP ACTIONS

The *Current Human Exposure Under Control* EI determination will be updated as necessary upon the discovery of new or contrary information

Attachment 1 CA725 Current Human Exposures Under Control

cc Bobbi Coleman, Division of Hydrogeology
Wayne Fanning, Trident District EQC Office
Syed Ahmed, RCRA Programs Branch, EPA Region 4

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS Event Code (CA725)

ATTACHMENT 1
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo Code (CA725)
Current Human Exposures Under Control

Facility Name: Bayer Corporation – Bushy Park Plant
Facility Address 1530 Bushy Park Road Goose Creek, SC 29445
Facility EPA ID #: SCD 048 373 468

1 Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e g , from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

__√__ If yes - check here and continue with #2 below,

____ If no - re-evaluate existing data, or

____ If data are not available skip to #6 and enter"IN" (more information needed) status code

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e g , reports received and approved, etc) to track changes in the quality of the environment The two EI developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater An EI for non-human (ecological) receptors is intended to be developed in the future

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i e , contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i e , site-wide))

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA) The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i e , potential future human exposure scenarios, future land and groundwater uses, and ecological receptors)

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRAInfo national database ONLY as long as they remain true (i e , RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information)

2 Are groundwater, soil, surface water, sediments or air **media** known or reasonably suspected to be "**contaminated**"[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	√			Arsenic**, benzene, chlorobenzene > MCL around regulated units
Air (indoors)[2]		√		Known plumes are not located below occupied buildings
Surface Soil (e g , <2 ft)	√			Releases from SWMUs / metals, VOCs, BNAs
Surface Water	√			Suspected release to wetlands (Well 99 (W-99) data) / benzene, chlorobenzene, arsenic
Sediment	√			Suspected release to wetlands (W-99 data) / benzene, chlorobenzene, arsenic
Subsurface Soil (e g , >2 ft)	√			Releases from SWMUs / metals, VOCs, BNAs
Air (outdoors)	√			SWMU 19 Drum Wash Drain / VOCs (suspected)

____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded

__√__ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation

____ If unknown (for any media) - skip to #6 and enter "IN" status code

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[1] 'Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range)

[2] Recent evidence (from the Colorado Dept of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks

Rationale and Reference(s)

- 4th Quarter / Annual 2000 RCRA Post-Closure Care Groundwater Monitoring Reports, March 5, 2000
- SP-2 Screening Report and COC Development, 3-19-01
- CS Work Plan, 8-16-00
- Description of Current Conditions / SWMU Status Report and SWMU Assessment Report (DOCC/SSR and SAR), 8-5-99
- Soil Vapor Survey at the C-9 Block SWMUs #18 and #19, 8-30-94
- Interim Report of Groundwater Quality at the Drum Wash Area SWMUs #18 and #19, 7-21-93

** a portion of arsenic contamination may be actually naturally occurring

3 Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table Potential **Human Receptors** (Under Current Conditions)							
"Contaminated" Media	**Residents**	**Workers**	**Day-Care**	**Construction**	**Trespassers**	**Recreation**	**Food**[3]
Groundwater	No	No	No	No	No	No	No
~~Air (indoors)~~							
Soil (surface, e g , <2 ft)	No	No*	No	No*	No**	No	No
Surface Water	No	No	No	No	No	Yes***	Yes***
Sediment	No	No	No	No	No	Yes***	Yes***
Soil (subsurface, e g , >2 ft)	No	No*	No	No*	No	No	No
Air (outdoors)	No	Yes#	No	Yes#	No	No	No

Instructions for Summary Exposure Pathway Evaluation Table

1 For Media which are not "contaminated" as identified in #2, please strike-out specific Media, including Human Receptors' spaces or enter "N/C" for not contaminated

2 Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway)

Note In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have assigned spaces in the above table While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary

____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e g , use optional Pathway Evaluation Work Sheet to analyze major pathways)

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[3] Indirect Pathway/Receptor (e g , vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc)

__√__ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation

_____ If unknown (for any "Contaminated Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s)

* worker / contractor training
** fences / natural barriers prevent access to site
*** W-99 data indicates possible discharge of groundwater exceeding MCLs into marsh however, exposures not expected to be significant due to dilution (see next page)
# SWMU 19 – Drum Wash Drain

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i e , potentially "unacceptable" because exposures can be reasonably expected to be 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"), or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable 'levels") could result in greater than acceptable risks)?

__√__ If no (exposures can not be reasonably expected to be significant (i e , potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant "

_____ If yes (exposures could be reasonably expected to be "significant" (i e , potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially 'unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be 'significant "

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s)

W-99 data indicates possible dishcharge of groundwater exceeding MCLs into tidal marsh Although the river is used for recreation purposes and there is fishing off of a nearby pier, exposures are not expected to be significant because of dilution (tidal) During low tide direct exposures are not expected because marsh is extremely difficult to access

With regard to air emissions, concerns are limited to one SWMU and worker presence in that area is limited

[4] If there is any question on whether the identified exposures are "significant" (i e , potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e g , a site-specific Human Health Risk Assessment)

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s)

SKIPPED (AS PER # 4)

6 Check the appropriate RCRAInfo status codes for the Current Human Exposures Under Control EI event code (CA725) and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility)

__√__ YE - Yes, "Current Human Exposures Under Control" has been verified Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the **Bayer Corporation – Bushy Park Plant** facility, EPA ID #**SCD 048 373 468**, located in **Berkeley County** under current and reasonably expected conditions This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility

____ NO - "Current Human Exposures" are NOT "Under Control "

____ IN - More information is needed to make a determination

Completed by Crystal D. Rippy Date 9-5-01
Crystal D Rippy, Engineering Associate
Operations Engineering Section
Bureau of Land and Waste Management

Supervisor Michelle D Sherritt Date 9-5-01 [5]
Michelle D Sherritt, Manager
Operations Engineering Section
Bureau of Land and Waste Management

Locations where References may be found

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Bureau of Land and Waste Management
8901 Farrow Rd, Suite 109
Columbia SC 29203

USEPA Region 4
RCRA Programs Branch
Waste Management Division
61 Forsyth Street
Atlanta, GA 30303

Contact telephone and e-mail numbers

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[5] FINAL NOTE. THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK